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(Translation)

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[NAME OF DOCUMENT] SPECIFICATION

[TITLE OF THE INVENTION] VIDEO TAPE RECORDER

[SCOPE OF CLAIMS FOR PATENT]

[Claim 1] A video tape recorder having a function writing/reading a cue signal to/from a magnetic tape and cueing information recorded on the magnetic tape; the video tape recorder comprising:

information obtaining means for inputting or collecting index information related to the information when recording information on a tape;

a non-volatile memory for reading and writing the index information;

cassette identifying means for identifying an inserted tape cassette;

writing means for distinguishing the index information obtained by the information obtaining means with an address corresponding to the cue signal and cassette identifying information from the cassette identifying means, and writing the index information to the non-volatile memory;

reading means for reading the corresponding index information from the non-volatile memory based on the cassette identifying information from the cassette identifying means;

## SHUSAKU YAMAMOTO

signal processing means for converting the index information read by the reading means to an image signal and outputting to a monitor;

address specifying means for specifying an address corresponding to the cue signal indicated by the index information displayed on the monitor;

cue signal detecting means for detecting the cue signal corresponding to the address specified by the address specifying means from the magnetic tape; and

reproducing means for, when the cue signal is detected by the cue signal detecting means, reproducing the recorded information of the magnetic tape recorded after the cue signal, and outputting to the monitor.

### [DETAILED DESCRIPTION OF THE INVENTION]

#### [Technical Field of the Invention]

The present invention relates to a video tape recorder (VTR) having a tape information search function.

#### [Prior Art]

Conventionally, a method of inputting a cue signal at the front of the information desired to be retrieved in the tape as seen in VISS, VASS, and the like is known as a means for rapidly retrieving information recorded on a magnetic tape (hereinafter simply referred to as tape). As described above, in order to search for the information recorded on the tape, a method of retrieving all the information related to an image signal recorded on the corresponding tape using the cue signal, and

## SHUSAKU YAMAMOTO

recording the same at the front of the tape as index information is known.

However, since the index information is recorded at the front of the tape in the conventional method, the tape needs to be re-winded up to the front in order to obtain the index information, whereby a possibility of mistakenly erasing the index information arises.

Furthermore, the recorded information is difficult to acquire if the index information is image information.

[Problems to be Solved by the Invention]

As described above, in the conventional VTR of recording the index information for searching the image information recorded on the tape at the front of the tape, a drawback is that the index information cannot be rapidly obtained since the tape needs to be re-winded up to the front to obtain the index information.

Furthermore, there is a possibility that the index information might be mistakenly erased since the index information is recorded on the erasable tape. The present invention aims to eliminate such drawbacks, and to provide a video tape recorder capable of preventing mistaken erasure of the index information and rapidly and accurately obtaining the index information.

[Means for Solving the Problems]

The present invention relates to a video tape recorder having a function writing/reading a cue signal to/from a magnetic tape and cueing information recorded on the magnetic tape; the video tape recorder including

## SHUSAKU YAMAMOTO

information obtaining means for inputting or collecting index information related to the information when recording information on a tape; a non-volatile memory for reading and writing the index information; cassette identifying means for identifying an inserted tape cassette; writing means for distinguishing the index information obtained by the information obtaining means with an address corresponding to the cue signal and cassette identifying information from the cassette identifying means, and writing the index information to the non-volatile memory; reading means for reading the corresponding index information from the non-volatile memory based on the cassette identifying information from the cassette identifying means; signal processing means for converting the index information read by the reading means to an image signal and outputting to a monitor; address specifying means for specifying an address corresponding to the cue signal indicated by the index information displayed on the monitor; cue signal detecting means for detecting the cue signal corresponding to the address specified by the address specifying means from the magnetic tape; and reproducing means for, when the cue signal is detected by the cue signal detecting means, reproducing the recorded information of the magnetic tape recorded after the cue signal, and outputting to the monitor.

In the video tape recorder of the present invention, the information obtaining means inputs or collects index

## SHUSAKU YAMAMOTO

information related to the relevant information when recording information on a tape, and sends the information to the writing means. The writing means distinguishes the index information obtained by the information obtaining means with an address corresponding to the cue signal and cassette identifying information from the cassette identifying means, and writes the same in the non-volatile memory. The reading means reads the corresponding index information from the non-volatile memory based on the cassette identifying information from the cassette identifying means, and sends the same to the signal processing means. The signal processing means converts the index information read by the reading means to an image signal and outputs the result to the monitor. The address specifying means specifies an address corresponding to the cue signal indicated by the index information displayed on the monitor, and provides the same to the cue signal detecting means. When the cue signal is detected in the cue signal detecting means, the reproducing means reproduces the recorded information on the magnetic tape after the cue signal and outputs the same to the monitor.

[Embodiments of the Invention]

One embodiment of the present invention will now be described with reference to the drawings. Fig. 1 is a block diagram showing one embodiment of a video tape recorder of the present invention. 1 is a microcomputer for performing control of recordation and reproduction

## SHUSAKU YAMAMOTO

of the VTR, search operation of the index information and the like; 2 is a barcode reader for reading a barcode 121 displayed on a tape cassette 12; and 3 is a key input device for inputting the index information etc. 4 is a control head for recording/reproducing the cue signal, the control signal and the like; 5 is a cue signal generating and detecting circuit for generating the cue signal or detecting the cue signal; 6 is a CRT control circuit for converting the input data to an image signal that can be displayed on a monitor (CRT) and the like; 7 is a volatile memory (EA-ROM herein) from which and to which the index information is read and written; 8 is a switch for switching between display or non-display of the index information; 9 is a video circuit for processing the image signal input from a video head 11 or the CRT control circuit 6 and outputting the same to a monitor; 10 is a tape driving circuit for fast-forwarding etc. the rewinding of the tape; 11 is a video head for recording and reproducing the video signal; 12 is a tape cassette on which the barcode 121 is displayed; and 13 is a monitor for displaying the index information or projecting the image information.

Figs. 2(A) and (B) are views showing in detail the vicinity of a cassette insertion slot of the VTR equipped with the barcode reader 2 shown in Fig. 1. 14 is a housing of the VTR and has a cassette insertion slot 15 formed at the front surface. The tape cassette 12 is inserted to the cassette insertion slot 15, where the barcode 121

## SHUSAKU YAMAMOTO

is attached to the tape cassette, and the barcode 121 is read by the barcode reader 2 until the tape cassette 12 is inserted to be positioned at a fixed position. In Fig. 2(B), (a) and (b) show other positions the barcode reader 2 can be attached.

The operation of the present embodiment will now be described. In the present example, in order to differentiate each of the video tapes, a barcode is displayed (attached) to the surface of the tape cassette 12 as an identification mark. Firstly, in the reproduction of the index information, when the tape cassette 12 shown in Figure 1 is inserted into the cassette insertion slot 15 shown in Figure 2, after the tape cassette is automatically and horizontally moved by a front loading method, the tape cassette is moved vertically and is stored in a fixed position. Thus, while the aforementioned tape cassette 12 is moving vertically, the barcode reader 2 reads the barcode 121 displayed on the tape cassette 12, and the resulting data  $S_1$  is outputted to the microcomputer of Figure 1. Microcomputer 1 reads the index information corresponding to the inputted data  $S_1$  from EA-ROM7 and provides the read index information  $S_2$  to the CRT control circuit 6. The CRT control circuit 6 converts the inputted index information  $S_2$  to an image signal, and this is outputted to the video circuit 9 through switch 8. Upon this conversion, the aforementioned index information is divided by the address information of cue

## SHUSAKU YAMAMOTO

signal VASS. When the switch 8 is closed, the image signal corresponding to the aforementioned index information S<sub>2</sub> is outputted to monitor 15 and displayed after being inputted to the video circuit 9 and processed. Herein, whether or not the aforementioned index information is to be displayed is selected by opening/closing the switch 5. In this way, when the image information corresponding to the aforementioned index information is searched by the index information displayed in the monitor 13, for example, the recording date, recording start/end time, tuning number, title, address of VASS, and the like, the user designates the address information of the cue signal VASS to the microcomputer 1 by a key input device 3. The microcomputer 1 which has received this controls the tape driving circuit 10 and to wind the tape. Upon this, the control head 4 reproduces the cue signal, and this is outputted to the cue signal generating and detecting circuit 5. The cue signal generating and detecting circuit 5 outputs the detection data S<sub>3</sub> to the microcomputer 1. When the inputted data S<sub>3</sub> matches the address designated by the user, the microcomputer 1 puts the VTR into a reproduction mode. Accordingly, the image information recorded after the cue signal is reproduced at the video head 11 and inputted to the video circuit 9. After having various processes, the image information is outputted on the monitor 13.

On the other hand, when recording the index

## SHUSAKU YAMAMOTO

information, if the VTR starts the operation of recording the image signal, the microcomputer 1 finds the address which is not used in the address of the cue signal VASS, and the cue signal corresponding to this address is created at the cue signal generating and detecting circuit 5, and this is automatically recorded on a control track of a tape through the control head 4. At the same time, the microcomputer 1 reads the VASS data to be recorded on the tape and the index information such as the date, time, tuning number and the like of the starting of the image recording from the timer circuit and the like (not shown), which is written in the EA-ROM7. Moreover, finally, the microcomputer 1 reads the end time by the timer circuit and the like when the recording of the image ends and writes it in the EA-ROM7. Moreover, after the user sets the microcomputer 1 into a writing mode of the index information by a key input device 3, an addition and deletion of the index information such as titles and the like from the same key input device 3 can be performed.

According to the present invention, in order to store the index information on EA-ROM7 and not on the tape, when the address of the cue signal VASS is designated, without having to forward the tape, the corresponding index information can be read from the EA-ROM7 and displayed on the monitor quickly and accurately. Moreover, since the index information is written in the EA-ROM7, the error deletion of the index

## SHUSAKU YAMAMOTO

information can be avoided.

Any device may be used as long as it can perform read and write, for example, a power supply backup RAM may be used instead of the EA-ROM as a non-volatile memory.

### [Effect of the Invention]

According to the VTR of the present invention described above, the index information is rapidly and accurately obtained while preventing mistaken erasure of the index information.

### [Brief Description of Drawings]

Fig. 1 is a block diagram showing one embodiment of a VTR of the present invention; and

Fig. 2 is a view showing a detailed example of a barcode reader of the VTR shown in Fig. 1.

### [Description of the Reference Numerals]

- 1      Microcomputer
- 2      Barcode reader
- 3      Key input device

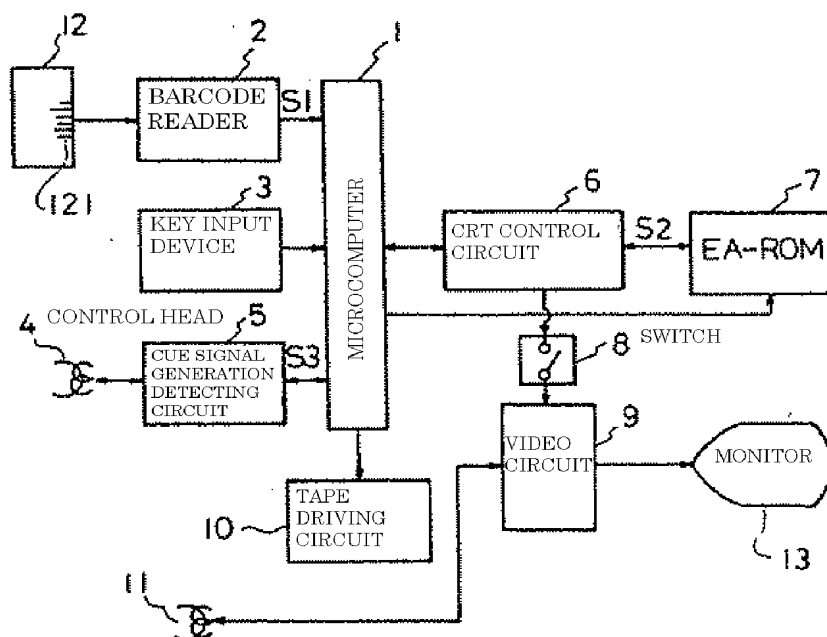


Fig.1

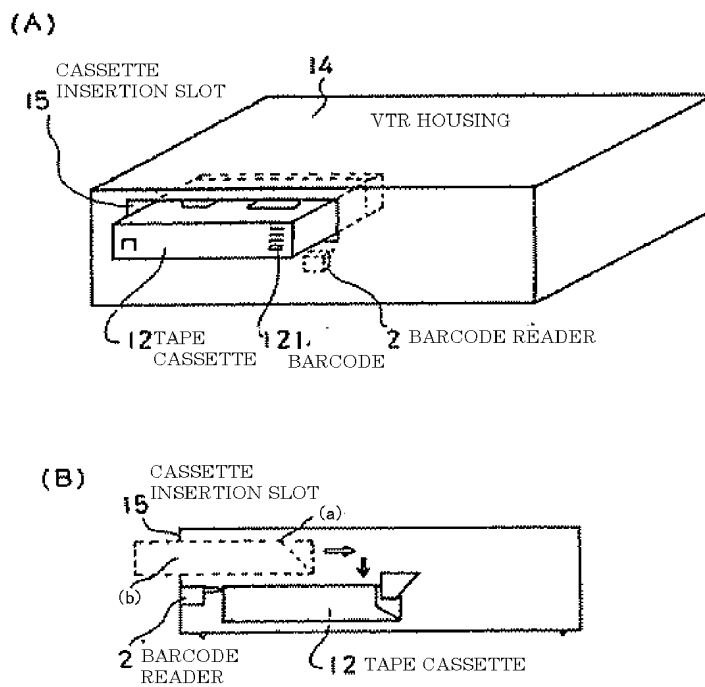


Fig.2